Answer Key -- Manufacturing Industries

Chapter 6 · Geography

Reading Guide · Glossary · Comprehension · Practice Questions · 10 Puzzles

NCERT Companion Workbook · Based on “Contemporary India II, Geography, NCERT Class X”

Comprehension Questions -- Answered

Q1. Why is manufacturing considered the backbone of a country's economic development?

Answer: Manufacturing modernises agriculture and reduces people's dependence on farm income alone by creating jobs in secondary and tertiary sectors. It also drives exports that bring in foreign exchange, and countries that convert raw material into higher-value finished goods tend to become more prosperous. The chapter treats manufacturing strength as a direct measure of a country's economic maturity.

Q2. How are industries classified on the basis of ownership? Give one example of each.

Answer: Public sector industries like BHEL and SAIL are owned and run by government agencies, while private sector industries like TISCO or Bajaj Auto are owned by individuals or companies. Joint sector industries, such as Oil India Ltd, are run jointly by government and private investors, and cooperative sector industries, like Maharashtra's sugar cooperatives, are owned by the producers or suppliers themselves. Each ownership type reflects a different way of organising capital and control.

Q3. What factors drew the cotton textile industry to Maharashtra and Gujarat?

Answer: The early textile industry concentrated there because of ready access to raw cotton grown locally, established markets, transport links including accessible ports, available labour and a suitably moist climate for spinning. These combined locational advantages made the region efficient for both production and export. The industry's roots in hand spinning and handloom weaving predate this factory-based concentration by centuries.

Q4. Why is the sugar industry well suited to the cooperative sector?

Answer: Sugar processing is seasonal, tied closely to the harvesting period of a bulky raw material that loses sucrose content quickly once cut, so producers benefit from an arrangement where they jointly own and manage the processing facility close to the fields. A cooperative structure lets cane growers share in the profits of processing rather than depend entirely on a separate private buyer. This local, grower-controlled model has proven especially successful in states like Maharashtra.

Q5. What raw materials does the iron and steel industry need, and in what proportion?

Answer: Steel production needs iron ore, coking coal and limestone, combined in roughly a four to two to one ratio, along with smaller quantities of manganese to harden the metal. Because all these raw materials and the finished product are heavy and bulky, transportation cost strongly influences where steel plants are built. This is why India's steel industry clusters so heavily around the Chota Nagpur plateau where these materials are found close together.

Q6. How does the chemical industry function as 'its own largest consumer'?

Answer: Basic chemicals produced by the industry are frequently used as inputs to manufacture further, more specialised chemicals rather than being sold directly to consumers. This internal reuse means a large share of the industry's own output becomes raw material for its next stage of production. Only after several such stages do many chemical products reach agriculture, industry or the consumer market directly.

Q7. What are the four types of pollution caused by industries, according to the chapter?

Answer: The chapter identifies air, water, land and noise pollution as the four categories caused by industrial activity. Air pollution comes from gases and particulate matter released by factories and power plants, while water pollution results from untreated effluents discharged into rivers. Land pollution follows from dumping solid waste, and noise pollution comes from machinery, generators and construction activity.

Q8. What steps can reduce industrial water pollution?

Answer: The chapter suggests minimising water use by reusing and recycling it across multiple stages of processing, harvesting rainwater to meet some water needs, and treating hot water and effluents before releasing them into

rivers or ponds. Treatment can happen in three phases: mechanical screening and sedimentation, biological processing, and a final chemical and physical stage that allows wastewater to be recycled. Together these steps reduce how much untreated pollution industry adds to water bodies.

Short-Answer Practice -- Model Answers

Q1. Which Indian city hosted the first successful cotton textile mill?

Answer: Mumbai, in 1854.

Reasoning: *Its port access, moist climate and proximity to cotton-growing regions made it a natural early hub for the industry.*

Q2. What raw material ratio is required for iron and steel production?

Answer: Iron ore, coking coal and limestone in roughly a 4:2:1 ratio.

Reasoning: *This ratio reflects how much of each bulky material must be transported to a plant, which is why steel plants tend to cluster near their raw material sources.*

Q3. Which region has the densest concentration of iron and steel plants in India?

Answer: The Chota Nagpur plateau region.

Reasoning: *Cheap iron ore, coal and labour are all found close together there, lowering transport costs for what is otherwise a very heavy industry.*

Q4. Which city is identified as the electronic capital of India?

Answer: Bengaluru.

Reasoning: *The chapter names it as the leading centre for electronic goods manufacturing and IT industry growth in the country.*

Q5. What boosted India's cotton textile industry during the World Wars?

Answer: Wartime demand for cloth from Britain.

Reasoning: *With Europe engaged in war, Britain needed more cloth supply, and India's mills expanded production to meet that colonial-era demand.*

Objective Practice

A. Multiple Choice Questions

1. Which industry uses bauxite as its main raw material?

✓ **a) Aluminium smelting**

b) Cement

c) Paper

d) Steel

2. Which industry manufactures telephones, computers and similar devices?

a) Steel

✓ **b) Electronics**

c) Aluminium smelting

d) Cement

3. The first successful cotton textile mill in India was established in which city?

a) Kolkata

b) Chennai

✓ **c) Mumbai**

d) Ahmedabad

4. What is the approximate ratio of iron ore, coking coal and limestone needed for steel-making?

a) 1:1:1

✓ **b) 4:2:1**

c) 2:4:1

d) 1:2:4

5. About sixty per cent of India's sugar mills are located in which two states?

a) Punjab and Haryana

✓ **b) Uttar Pradesh and Bihar**

c) Maharashtra and Karnataka

d) Gujarat and Rajasthan

6. The first jute mill in India was set up near which city?

a) Mumbai

✓ **b) Kolkata**

c) Chennai

d) Surat

7. Public sector industries are owned and operated by whom?

a) Individuals

✓ **b) Government agencies**

c) Foreign companies

d) Cooperatives only

8. Which of the following is an example of a joint sector industry?

a) TISCO

b) Bajaj Auto Ltd.

✓ **c) Oil India Ltd.**

d) SAIL

9. Which agro-based industry is especially well suited to the cooperative sector?

a) Cement

✓ **b) Sugar industry**

c) Aluminium smelting

d) Electronics

10. Aluminium smelting is described as India's which most important metallurgical industry?

a) First

✓ **b) Second**

c) Third

d) Fourth

B. True or False

1. Manufacturing industries help reduce dependence on agricultural income alone. -- TRUE
2. Public sector industries are owned and run by private individuals. -- FALSE
3. India's textile industry covers the complete chain from raw fibre to finished product. -- TRUE
4. Iron and steel is classified as a light industry because of its low weight. -- FALSE
5. The chemical industry in India includes both organic and inorganic sectors. -- TRUE
6. Noise pollution has no effect on human health. -- FALSE
7. Treating industrial effluents before releasing them into rivers helps reduce water pollution. -- TRUE
8. Bengaluru is recognised as India's electronic capital. -- TRUE

C. Match the Following

Column A	Column B
1. Ginning	a) Industry owned and run by government agencies
2. Sericulture	b) Industry owned jointly by producers
3. Smelting	c) Region with the densest steel plant concentration
4. Public sector	d) Extracting metal from ore using heat
5. Cooperative sector	e) Separating cotton fibre from its seed
6. Chota Nagpur plateau	f) Liquid waste discharged by factories
7. Effluent	g) Rearing silkworms for silk fibre
8. Bengaluru	h) India's leading electronics and IT industry hub

Answers: 1-e, 2-g, 3-d, 4-a, 5-b, 6-c, 7-f, 8-h

Higher-Order Thinking (HOTS) Questions -- Model Answers

Q1. The chapter argues agriculture and industry 'move hand in hand.' Using the fertilizer and textile examples, explain how growth in one sector can drive growth in the other.

Answer: The fertilizer industry raises agricultural productivity by supplying farmers with nutrients their soil lacks, while the textile industry depends on farmers to grow the cotton and jute it processes into fabric. Growth in fertilizer output can boost crop yields, which in turn supplies more raw material to agro-based industries like textiles, while textile industry earnings can support demand for further agricultural inputs. This two-way relationship shows why the chapter treats agriculture and industry as interdependent rather than separate sectors.

Q2. Why might the government have promoted public and joint sector industries alongside private ones after Independence, based on the chapter's stated aims?

Answer: The chapter links public and joint sector industries to the goals of eradicating unemployment and poverty and reducing regional disparities by establishing industries in tribal and backward areas that private investors might

otherwise avoid. Private capital tends to flow toward already profitable, well-connected regions, so government-owned or jointly-owned enterprises could be directed deliberately toward underdeveloped areas instead. This made public and joint sector industry a tool for balanced regional development rather than purely for profit.

Q3. The Chota Nagpur plateau has both rich mineral wealth and heavy industrial pollution. What tension does this create between economic development and environmental protection?

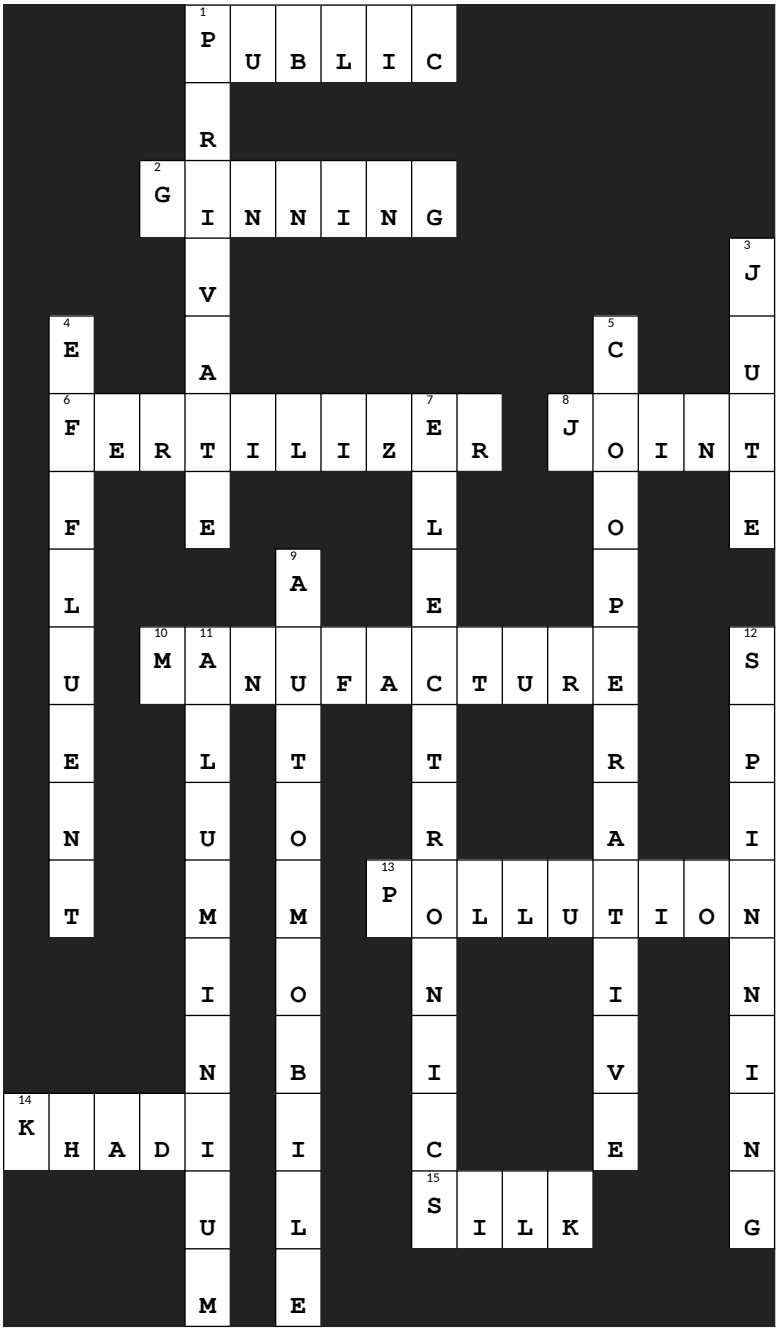
Answer: The same low-cost, high-grade raw materials that make the Chota Nagpur plateau attractive for heavy industry also mean the region bears the concentrated environmental cost of mining, smelting and processing, including air, water and land pollution. Economic development in the region has historically depended on exploiting exactly the resources whose extraction and processing cause this damage. Balancing continued industrial growth with pollution control therefore requires deliberate regulation, since the market incentives alone tend to favour extraction over environmental protection.

Q4. Compare the location factors for a bulky raw-material industry like cement with a knowledge-based industry like electronics.

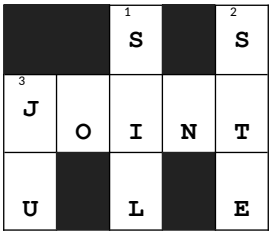
Answer: Cement production needs to be located near its heavy, bulky raw materials such as limestone, silica and gypsum, since transporting these long distances would be costly, which is why cement plants cluster near quarrying regions. Electronics manufacturing instead depends far less on physical raw material weight and far more on access to skilled labour, infrastructure and market connectivity, which is why it has concentrated in cities like Bengaluru rather than near any particular mineral source. This contrast shows how the nature of an industry's inputs, not just its overall size, shapes where it locates.

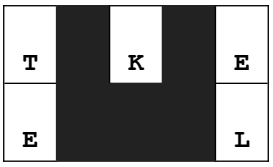
Puzzle Pack -- 10 Puzzles for This Chapter

1. Crossword



2. Mini Crossword





3. Word Search

T	Q	T	C	R	X	B	H	R	I	I	D	A	H	K
N	C	N	R	F	C	G	A	R	N	A	L	E	L	M
E	N	E	C	R	I	C	N	R	E	U	A	L	U	W
U	O	M	O	J	L	G	D	C	T	T	C	E	M	P
L	I	E	O	S	B	N	L	F	A	O	I	C	A	J
F	T	C	P	P	U	I	O	W	V	M	M	T	N	M
F	U	J	E	I	P	T	O	E	I	O	E	R	U	U
E	L	U	R	N	W	L	M	A	R	B	H	O	F	I
L	L	T	A	N	D	E	G	V	P	I	C	N	A	N
I	O	E	T	I	Z	M	P	I	M	L	Y	I	C	I
T	P	A	I	N	E	S	N	N	Q	E	H	C	T	M
X	U	L	V	G	R	R	N	G	M	A	Z	S	U	U
E	C	F	E	R	T	I	L	I	Z	E	R	F	R	L
T	Z	T	Y	D	C	O	N	S	U	M	E	R	E	A
L	L	U	O	G	I	N	N	I	N	G	S	I	L	K

4. Cryptogram

Encoded: CYV WYFXCMYT YJU TKHYFMKJ FKPXFLXC GLYIX VLXCX MJUMY'G NYHFKCMXG PCKV.

Plain: Raw material and location together shape where India's factories grow.

Key: A=X B=Z C=R D=Q E=B F=T G=S H=C I=P J=N K=O L=H M=I N=F O=K P=G Q=Y R=V S=J T=L U=D V=W W=M X=E Y=A Z=U

5. Caesar Coded Message

Encoded: BPCJUPRIJGXCV XCSJHIGXTH. GPL BPITGXPA PCS ADRPIXDC IDVTIWTG HWPET LWTGT XCSXP'H UPRIDGXTH VGDL.

Plain: Manufacturing Industries. Raw material and location together shape where India's factories grow.

Shift: 15

6. Word Scramble

1. ELHACCMI → CHEMICAL

2. LTIEEXT → TEXTILE

3. SIEECRNTOLC → ELECTRONICS

4. NCUUFAAMTRE → MANUFACTURE

5. TJEU → JUTE

6. IEFLRETRZI → FERTILIZER

7. KLIS → SILK

8. GPNNSNII → SPINNING

9. VEIAOPTCEOR → COOPERATIVE

10. INIAULMUM → ALUMINIUM

7. Acrostic

I -- SMELTING

N -- MANUFACTURE

D -- KHADI

U -- JUTE

S -- SPINNING

T -- TEXTILE

R -- CONSUMER

Y -- (open)

Theme: INDUSTRY

8. Match the Pairs

A → 8

B → 4

C → 1

D → 2

E → 6

F → 5

G → 3

H → 7

9. Fill in the Blanks

1. Extracting metal from its ore using intense heat is called _____. → SMELTING

2. The light metal smelted from bauxite is called _____. → ALUMINIUM

3. Liquid industrial waste discharged into rivers is called _____. → EFFLUENT

4. Separating cotton fibre from its seeds before spinning is called _____. → GINNING

5. A strong alloy of iron used widely in construction and engineering is _____. → STEEL

6. An industry owned jointly by government and private investors is a _____ sector industry. → JOINT

7. Hand-spun, handwoven cloth linked to cottage industry is called _____. → KHADI

8. An industry owned and run entirely by government agencies is a _____ sector industry. → PUBLIC

10. Odd One Out

1. Smelting -- a metal-extraction step, not a textile-making stage

2. Effluent -- industrial waste, not a form of business ownership

3. Bauxite -- a mineral raw material, not a natural fibre

4. Fertilizer -- an agricultural input, not a form of industrial pollution